

RESONATOR, FILTER, DUPLEXER,  
AND COMMUNICATION APPARATUS

ABSTRACT

Ring-shaped resonant elements include respectively conductor lines 2a, 2b, and 2c each formed on a substrate 1 along a full one turn of circumferential length of a ring. Each of the conductor lines 2a, 2b, and 2c has two end portions which additionally extend and which are located such that they closely adjoin each other in a width direction. The respective ring-shaped resonant elements are disposed in a concentric fashion. Capacitive parts are formed in areas in which two ends of respective conductor lines are located in close proximity to each other, and the other parts of the respective conductor lines function as inductive parts. Each conductor line operates as a half-wave transmission line whose both ends are electrically open. It is not needed to form a ground electrode on a surface of the substrate opposite to the surface on which the conductor lines are formed. Thus, a resonator can be formed using a very small number of constituent elements. A resonator, a filter, a duplexer, and a communication apparatus having a small size and a high conductor Q-factor can be produced at reasonably low cost.